MEMORANDUM FOR: All NWS Regional Headquarters, Regional Maintenance Specialists, Electronic Systems Analysts, and Electronics Technicians [Engineering Handbook (EHB)-9 distribution]

FROM: W/OPS1 - John McNulty

SUBJECT: Transmittal Memorandum for EHB-9 Issuance 01-09

1. Material Transmitted:

Engineering Handbook No. 9 (EHB-9), Automatic Radiotheodolite (ART)-1/2, Section 2.4, ART-1/2 Maintenance Note 19, Rev A, ART-1/2 Receiver Alignment.

2. Summary:

Changes to (Paragraphs 1.2.2.h, 1.2.5.c, 1.2.6,j), and 2nd note on paragraph 1.1.1 and removed paragraph 1.7.

3. Effect on Other Instructions:

These instructions supersede the receiver alignment found in the ART-1/2 blue factory manuals. Make pen and ink changes to the Instruction Manual Number 9-601 (ART-1, 1R Maintenance) and 9-701 (ART-2, 2R Maintenance), Volume 1, pages 5-17, paragraph 5.2.4.2. Enter the following notation: “Refer to Maintenance Note 19, Rev A, for ART-1/2 Receiver Alignment procedure.”

ART-1/2 MAINTENANCE NOTE 19, Rev A, (for Electronics Technicians)
Maintenance Branch
W/OPS12: FJZ

SUBJECT	:	Audio Radiotheodolite (ART)-1/2 Receiver Alignment
PURPOSE	:	To provide ART-1/2 receiver alignment procedures
EQUIPMENT AFFECTED	:	All ART-1/2 systems
PARTS REQUIRED	:	None
SPECIAL TOOLS REQUIRED	:	Type — Manufacturer/Model (or equivalent) Signal Generator — Marconi 2024 Frequency Counter — M1 Optoelectronics Handicounter Oscilloscope — Tektronics 465 Digital Voltmeter — Fluke 8050A Tuning Tools — Standard Field Assortment
MODIFICATION PROCUREMENT	:	None
SITES AFFECTED	:	All ART-1 and ART-2 sites
ESTIMATED TIME REQUIRED	:	2 Hours
EFFECT ON OTHER INSTRUCTIONS	:	Make pen and ink changes to the Instruction Manual Number 9-601 (ART-1, 1R Maintenance) and 9-701 (ART-2, 2R Maintenance), Volume 1, pages 5-17, paragraph 5.2.4.2. Enter the following notation: *Refer to Maintenance Note 19, Rev A, for ART-1/2 receiver alignment procedure.*
AUTHORIZATION	:	N/A
VERIFICATION STATEMENT	:	This procedure was tested at the National Weather Service Training Center.
TECHNICAL ASSISTANCE	:	For questions or problems pertaining to this alignment, please contact Franz J. G. Zichy at 301-713-1833 x128.

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GENERAL:

Maintenance Note 19, Rev A, provides a revised ART-1/2 receiver alignment procedure for use with the new Marconi 2024 Signal Generator.

PROCEDURE:

1. Receiver Alignment

This field alignment procedure is written for the ART-1/2 radio frequency (RF) assembly and remote/automatic control unit (R/ACU). These procedures are applicable when performing periodic maintenance, performance verifications, and particularly after replacement of the following subassemblies:

Reference Designation	Description
1A2A1	RF Assembly
1A3A1A1A5	Video Amplifier
1A3A1A1A6	Automatic Gain Control (AGC)/Range Demodulator
1A3A1A1A7	AFC/AGC/AM Detector
1A3A1A1A8	AFC Mode Programmer
1A3A1A1A10	Mux Control (Meter Driver)
3A3A1A6	Retransmitter

NOTE: Perform the Marconi Signal generator memory configurations as described in the attachment of this note.

CAUTION

Correct alignment of the R/ACU Power Supplies (±15 volts in particular) is a prerequisite for the receiver circuit alignment. In addition, some of the above assemblies contain adjustable components that are exclusively associated with the tracking circuit and are addressed in the tracking alignment procedure (Maintenance Note 20, Rev A).

1.1 Receiver Alignment Procedure

To preserve continuity of setup and proper sequence of adjustments and measurements, perform (or verify) the following procedures in the exact order given.

1.1.1 Initial Setup

NOTE: 1. These alignment procedures were written under the assumption that initial equipment adjustments are incorrect. The alignments can be performed with a minimum dependency on other alignment sections.

a. Disconnect the antenna input cable and attach the Marconi 2024 signal generator to the RF assembly RF input jack (J4). Unless otherwise specified, AM Depth is 30 percent ON, and Pulse is OFF.

b. Prior to performing the alignment, verify the zero point of the SIGNAL LEVEL/FREQUENCY meter is set properly. The meter should be checked with the system power turned off. The adjustment is on the rear of the meter.

NOTE: 2. Always use a 10X probe when using an oscilloscope or frequency counter to monitor the 10.7 MHz IF on the A1 test panel.

c. Unless otherwise specified, the basic R/ACU switch settings are as follows:

POWER	ON
STANDBY	illuminated
OVERRIDE	extinguished
SIMULATOR	OFF
TRACK MODE	manual
AM/FM	AM
LOW SENSITIVITY	extinguished

1.1.2 Receiver Tuning Range (A8R1, A8R2)

a. Connect the oscilloscope and frequency counter to the 10.7 MHz IF on the test panel. Monitor A8TP14 with a DVM.

b. Connect the signal generator to the RF input of the RF assembly.

c. Press the [RCL] 101 [ENTER] to set for 1655 MHz, @ -60 dBm.

d. Press to illuminate MANUAL SEARCH and MGC. Rotate MGC GAIN fully clockwise (CW).

e. Hold FREQUENCY switch down until the lowest tuned voltage is reached. Press FREQUENCY switch UP for 5 seconds. If the signal on the oscilloscope shows a peak within this 5-second period, the low end tuning range is set properly. If not, press frequency switch DOWN to return to lowest tuned voltage. Tune with A8R2 (tuning offset) for maximum signal on oscilloscope. Adjust MGC GAIN for 1.8 V p-p. Rotate A8R2 slightly counterclockwise (CCW) to increase the frequency on the frequency counter by 1 ±0.5 MHz to ensure band-edge overlap.

f. Using the FREQUENCY switch, observe a 10.7 MHz frequency counter reading.

g. Using the FREQUENCY switch, slew up in frequency until A8TP14 is at the maximum negative voltage. The MGC setting from step d should be sufficient.

h. Press [CARR FREQ] and [KNOB/STEP]. Then press [⇩x10] until the cursor is directly underneath 1655. Using the control knob, slowly tune the signal generator for maximum signal indication on the oscilloscope. Observe the signal generator displayed frequency. It should be 1705 to 1710 MHz.

i. If the upper frequency is too low, turn A8R1 CCW and repeat steps c through g. If the upper frequency is too high, turn A8R1 CW and repeat steps c through g (the MGC adjustment in steps e and f should be sufficient). The adjustment is roughly 1 turn per MHz.

j. Repeat as necessary until the lower frequency limit is 1655 MHz ±1 MHz, and the upper limit is 1705 MHz ±1 MHz.

1.1.3 Frequency Meter Calibration (A10R10 and A10R7)

NOTE: Before proceeding, ensure the SIGNAL LEVEL/FREQUENCY meter is set to zero. Perform this check with the system power turned OFF. The adjustment screw is on the rear of the meter.

a. Press [RCL] 102 [ENTER] to set the signal generator for 1670 MHz, @ -60 dBm.

b. Press to illuminate MANUAL SEARCH and MGC. The previous MGC GAIN setting should be sufficient.

c. Tune the receiver with the FREQUENCY switch until the oscilloscope indicates a maximum signal at 1670 MHz, Adjust MGC Gain for 1.8 V p-p. Fine tune (using R/ACU Frequency switch) for 10.7 ±0.1 MHz on the frequency counter.

d. With the signal generator set to 1670 MHz, adjust A10R7 for 1670 MHz indication on the FREQUENCY meter.

e. Press [RCL] 1 [ENTER] to set the signal generator to 1690 MHz. Tune the receiver with the FREQUENCY switch for maximum signal, 10.7 ±0.1 MHz IF.

f. Observe the FREQUENCY meter. If it reads 1690, the calibration is complete. If not, rotate A10R10 until the frequency meter reads the same error on the other side of 1690 (i.e., for 1693, set A10R10 for 1687). Repeat until both 1670 and 1690 match. The signal generator frequency can by toggled between 1670 and 1690 MHz by pressing [RCL] 0 [ENTER] and [RCL] 1 [ENTER].

1.2 AGC Adjustments Procedure

1.2.1 Initial Setup

a. Turn power OFF and place the A7 circuit card on the extender board. Turn power ON.

b. Connect the oscilloscope and frequency counter to the 10.7 MHz IF line.

c. Connect the signal generator to the RF assembly input and press [RCL] 100 [ENTER], to set the signal generator to 1680 MHz, @ -60 dBm.

1.2.2 RF Assembly AGC Balance Adjustment (AGC/Requlator 1A2A1A5R2)

NOTE:

1. This adjustment matches the AGC characteristic of the 10.7 MHz IF amplifier to the AGC characteristic of the 60 MHz IF amplifier and readjusts the AGC balance adjustment on the RF assembly for optimum AGC balance.
2. All tuned circuits in the RF assembly are set at the National Reconditioning Center (NRC). If the RF assembly does not meet performance requirements, it should be replaced and sent to the NRC for repair.
3. The RF assembly heater requires 15 minutes to warm up. Frequent AGC alignments may be indicative of a defective heater. The bottom of the RF assembly should feel warmer than the ambient temperature. Replace the RF assembly if the heater is presumed defective.

a. Verify LOW SENSITIVITY is extinguished.

b. Press to illuminate MGC switch. Turn the MGC knob fully CW (maximum gain). Press to illuminate MANUAL SEARCH.

c. Tune the receiver with the FREQUENCY toggle switch until the received signal is at a peak voltage on the oscilloscope. Adjust MGC Gain to avoid saturation.

d. Monitor A7-D (Gain on the test panel) with the DVM.

e. Press to illuminate LOW SENSITIVITY.

f. Press [RCL] 103 [ENTER] to set the signal generator to 1680 MHz, @ -74 dBm.

g. Fine tune to 10.7 ±0.1 MHz on the frequency counter.

h. Adjust MGC Gain knob for 1.8 V p-p on the oscilloscope. Observe between 6 and 9.0 VDC on the DVM. If not, set the MGC for 8.00 VDC on the DVM and adjust the AGC BALANCE R2 (RF Assembly) for 1.8 V p-p on the oscilloscope.

NOTE: 4. This setting is readjusted later for proper receiver dynamic range. The 8.00 V is considered a good starting point.

i. Press to extinguish LOW SENSITIVITY.

1.2.3 AM Detector DC Balance Adjustment (A7R60)

NOTE: This adjustment is set by the repair depot to null out DC offsets of circuits internal to the A7 card. This alignment is usually not necessary as part of the routine maintenance alignment and is given here solely for reference purposes.

a. Connect the oscilloscope and frequency counter to the 10.7 MHz IF on the test panel.

b. Press [RCL] 100 [ENTER], to set the signal generator to 1680 MHz, @ -60 dBm.

c. On the R/ACU, press to illuminate MANUAL SEARCH and MGC. The prior setting of the MGC control should suffice. If not, set the MGC control fully CW.

d. Tune the receiver with the FREQUENCY toggle switch for maximum signal level on the oscilloscope. Fine tune to 10.7 ±0.1 MHz on the frequency counter.

e. Monitor A7TP7 with the DVM; turn the MGC control CCW for a null (0 ± 0.01 VDC) at TP7.

f. Move the DVM to U10 pin 12.

g. Adjust A7R60 for 0 ±0.1 VDC on the DVM. Recheck A7TP7 for 0 ± 0.01 VDC.

1.2.4 AGC Threshold Adjustment (A7R81)

NOTE: This adjustment is set by the repair depot to null out DC offsets of circuits internal to the A7 card. This alignment is usually not necessary as part of the routine maintenance alignment and is given here solely for reference purposes.

a. Press [RCL] 100 [ENTER], to set the signal generator to 1680 MHz, @ -60 dBm.

b. On the R/ACU, press to illuminate MANUAL SEARCH and MGC. The MGC control setting should be correct from previous steps. If not, rotate fully CW.

c. Tune the receiver with the FREQUENCY toggle switch for maximum signal level on the oscilloscope. Fine tune for 10.7 ±0.1 MHz on the frequency counter. Adjust the MGC control for 1.8 V p-p. Reset for 10.7 ± 0.1 MHz if necessary.

d. Press to extinguish MGC. This closes the AGC loop. Press [RCL] 105 [ENTER], to set the signal generator to 1680MHz, @ -100 dBm. Press [RF LEVEL], [KNOB/STEP]. While turning the control knob, observe for signal levels of greater than -100 dBm; the oscilloscope displays a 1.8 V p-p signal. Observe that below -104 dBm the IF signal level starts to drop. If so, the AGC THRESHOLD and AGC CLIPPER adjustments are correct; skip to paragraph f, AGC Balance.

e. If the above tests are not met, rotate A7R113 fully CW to eliminate AGC clipping (R113 is reset in the next procedure).

f. Press [RCL] 106 [ENTER], to set the signal level to 1680 MHz, @ -80 dBm, and then adjust A7R81 for 1.8 V p-p on oscilloscope.

g. This completes the THRESHOLD adjustment. The AGC CLIPPER adjustment must now be reset.

NOTE: The AGC threshold adjustment must be performed before proceeding with the AGC clipper adjustment.

1.2.5 AGC CLIPPER Adjustment (A7R113)

This adjustment procedure is a continuation of the AGC threshold adjustment. This procedure limits the receiver gain below -104 dBm.

a. Press [RCL] 107 [ENTER], to set the signal level to 1680MHz, @ -104 dBm. Observe 1.8 V p-p on the oscilloscope.

b. Monitor A7-D (on test panel) with the DVM. Note the voltage.

c. Rotate A7R113 CCW until the DVM voltage drops by 0.1 volt (i.e., 8.5 VDC drops to 8.4 VDC). Note the IF signal on the oscilloscope. The signal should start decreasing at this point.

1.2.6 AGC Balance Adjustment (RF Assembly A5R2)

This adjustment readjusts the AGC Balance adjustment on the RF assembly for optimum AGC balance.

a. Press [RCL] 103 [ENTER] to set the signal generator to 1680 MHz, at -74 dBm.

b. Press the [MOD ON/OFF] key to turn the modulation on.

c. On the R/ACU, verify MANUAL SEARCH is illuminated, LOW SENSITIVITY is extinguished, and MGC is extinguished.

d. Verify 1.8 V p-p is at 10.7 MHz. Fine tune, if necessary, for 10.7 ±0.1 MHz.

e. Connect the 4800 Hz, 5 V signal at A15TP6 to the EXT MOD INPUT jack on the signal generator.

NOTE: Sync A15TP6 to the oscilloscope channel 2 input.

f. Verify the AM pulse modulation appears on the test panel monitored 10.7 MHz IF signal.

g. Move the oscilloscope probe from the 10.7 MHz IF test point to A7TP7 (AM detector output).

h. Note the peak-to-peak voltage of the pulses at A7TP7.

i. Press [RCL] 104 [ENTER], [MOD ON/OFF] to set the signal generator to 1680 MHz, @ -5 dBm and modulation on.

j. Adjust the RF assembly AGC BALANCE adjustment A5R2 (located on the RF Assembly) for ½ the peak-to-peak voltage observed in step h.

k. Remove the 4800 Hz signal used in step e.

1.2.7 Carrier Detector Adjustment (A7R75)

This adjustment sets the minimum detected tracking signal. It is nominally set to sense a signal of -104 dBm or greater.

a. Press [RCL] 105 [ENTER], to set the signal generator to 1680 MHz, @ -100 dBm.

b. On the R/ACU, verify that MANUAL SEARCH is illuminated and MGC is extinguished.

c. Connect oscilloscope to 10.7 MHz IF line test point.

d. Tune the receiver with the FREQUENCY toggle switch for maximum signal level on the oscilloscope. Fine tune for 10.7 ±0.1 MHz on the frequency counter. Observe 1.8 V p-p on the oscilloscope. Adjust A7R113 to achieve 1.8 V p-p.

e. Monitor A7-K (Carr. Det. on test panel) with the DVM.

f. Press [RF LEVEL] and [KNOB/STEP].

g. With the control knob, slowly vary the generator signal level between -100 and -110 dBm. Observe the DVM indicates logic 1 (+5 Vdc) for a signal level of -104 dBm and greater and switches to Logic 0 (0.4 Vdc) when the signal level is reduced to -106 ±1.5 dBm. If not, with the control knob, set the generator signal level to -106

dBm. Adjust A7R75 until DVM switches to Logic 0. Carefully readjust R75 until DVM just switches to Logic 1 (+5 V).

h. If necessary, repeat steps f and g to ensure proper adjustment.

1.2.8 Signal Level Meter Adjustments (Zero and Scale) (A7R78 and A10R6)

a. Press [RCL] 105 [ENTER], to set the signal generator to 1680 MHz, at -100 dBm.

b. On the R/ACU, verify MANUAL SEARCH is illuminated and MGC is extinguished.

c. Tune the receiver with the FREQUENCY toggle switch for maximum signal level on the oscilloscope. Fine-tune for 10.7 ±0.1 MHz on frequency counter. Observe 1.8 V p-p.

d. Press [RF LEVEL] then [KNOB/STEP] and adjust the signal generator to -104 dBm. Observe 1.8 V p-p.

e. Remove the oscilloscope probe. Adjust A7R78 for 0 dB on the SIGNAL LEVEL meter.

f. Press [RCL] 108 [ENTER], to set the signal generator for 1680 MHz, @ -4 dBm.

g. Verify 10.7 ±0.1 MHz on the frequency counter.

h. Adjust A10R6 for a reading of 100 dBm on the SIGNAL LEVEL meter.

1.3 AFC Alignment

NOTE: The AFC alignment uses the MGC mode and is therefore independent of the AGC section. The AFC section is preset at the NRC. If the AFC section cannot be aligned, remove the A7 card and return for depot repair.

1.3.1 Setup

Disconnect the RFA output to the R/ACU at either J2 (RFA) or J6 (R/ACU). Connect the Marconi signal generator and an oscilloscope to either J6 on the R/ACU rear chassis or J1 on the A7 board.

CAUTION

The following three AFC DISCRIMINATOR section adjustments on the A7 card are calibrated at the NRC and should not be adjusted in the field.

(1) IF limiter tuning capacitor A7C5
(2) AFC discriminator high frequency inductor A7L4
(3) AFC discriminator low frequency inductor A7L5

1.3.2 AFC Discriminator Crossover Adjustment (A7R13)

This procedure adjusts the center frequency of the AFC Discriminator and determines the center IF frequency for the AFC.

a. Verify proper adjustment of the positive and negative 15 V power supplies (± 0.01 V).

b. Turn the system power OFF, place the A7 card on an extender, and turn the system power ON.

c. Press [RCL] 109 [ENTER], to set the signal generator frequency to 10.7 MHz, @ +6.2 dBm; adjust the RF level for 1.8 V p-p.

d. Monitor A7TP2 with a DVM.

e. Set A7R13 for 0.000 volts on the DVM.

1.3.3 AFC Error Gain Adjustment (A7R24)

This procedure sets up the 3.2 volt/MHz AFC curve required by the AFC threshold gates.

a. Monitor A7TP3 with a DVM.

b. Press [RCL] 110 [ENTER], for a signal generator reading of 10.45 MHz, @ 6.2 dBm. Note the voltage at TP3.

c. Press [RCL] 3 [ENTER], for a signal generator reading of 10.95 MHz, @ -74 dBm. Note the voltage at TP3.

d. The difference between the two voltages should be 1.6 ±0.15 V. If not, adjust A7R24 and repeat. (Turning R24 CW reduces the difference between the two voltages; turning R24 CCW increases it.) Press [RCL] 2 [ENTER] and [RCL] 3 [ENTER] to toggle between the two frequencies.

1.3.4 AFC Offset Adjustments (A7R19)

NOTE: The AFC error gain adjustment procedure (section 1.4.3) must be performed immediately prior to performing this procedure.

a. Press [RCL] 109 [ENTER], to set the signal generator to 10.700 MHz, @ 6.2 dBm.

b. Move DVM to A7TP2 and verify 0 V.

c. Move DVM back to TP3, and adjust A7R19 for +7.50 V.

1.3.5 AFC Error Service Meter Adjustment (A7R87)

This procedure zeroes the SERVICE METER AFC position.

a. Set the test selector switch to an unused position and verify the zero point of the SERVICE METER is set properly. The adjustment is located on the back of the meter.

b. Position the test selector switch in the AFC position.

c. Press [RCL] 109 [ENTER], to set the signal generator to 10.700 MHz, @ 6.2 dBm.

d. Adjust A7R87 for 0 µA reading on the SERVICE METER.

1.3.6 AFC Lock Adjustment (A7R28)

This procedure establishes the width of the +25 kHz AFC LOCK signal.

a. Verify the signal generator is set to 10.7 MHz. If not, press [RCL] 109 [ENTER].

b. Monitor A7TP4 with an oscilloscope.

c. Press [CARR FREQ] and [KNOB/STEP]. Press [⇩÷10] twice. While observing TP4, slowly tune the signal generator with the control knob.

NOTE: For a small range on either side of 10.7 MHz, TP4 is at logic 0. Note the frequencies at which the level changes; they should be approximately 50 kHz apart (10.675 MHz to 10.725 MHz). If not, adjust A7R28 for a 50 kHz wide logic 0 gate at TP4. Turning A7R28 CW will narrow the window.

d. If necessary, adjust A7R19 so the logic 0 gate at TP4 "straddles" 10.700 MHz and the level changes to logic 1 at either side of 10.700 MHz.

1.3.7 Limited Search Width Switch (A6S1)

In LIMITED SEARCH mode, the limits of the frequency search are established by the search interval switch (A6S1) located at the top edge of the A6 assembly. The four-pole switch can be set for the desired sweep width in ±0.5 MHz increments. The switch sections are labeled 1 through 4 corresponding to weights of ±0.5, ±1.0, ±2.0, and ±4.0 MHz. The active condition corresponds to "OPEN" on the switch body. **The default setting is ±5.0 MHz** which has sections 2 and 4 active (OPEN) and sections 1 and 3 inactive. Other desired search widths may be selected by activating the appropriate sections to produce an additive result up to a maximum of +7.5 MHz. The 0 setting (all inactive) is not allowed.

This completes the AFC alignment. The receiver should acquire and track signals over the frequency range and dynamic range (signal level) of the system.

1.4 MET Data Digitizer Alignment

This procedure aligns the MET data amplitude and pulse width discriminators for MET data pulse transmission to the MCU.

1.4.1 MET Threshold Adjustment (A5R21)

NOTE: The detector-heater module on the A7 card maintains the AM detector diodes at a constant temperature. If the heater fails, MET threshold settings will drift and may require repeated adjustment. If the detector-heater module is defective, replace the A7 card.

a. Connect the signal generator to the RF assembly RF input.

b. Press [RCL] 111 [ENTER], [MOD ON/OFF], to set the signal generator to 1680 MHz, @ -60 dBm, Pulse Mod INT ON at 100 Hz.

c. At the R/ACU, set AGC mode (MGC Extinguished) and press to illuminate LIMITED SEARCH. Allow the receiver to lock onto the signal generator.

d. With the oscilloscope, monitor A7TP7 and observe the narrow negative-going MET pulses.

NOTE: Sync A5TP7 to the oscilloscope channel 2 input.

e. With the oscilloscope, monitor A5TP4. Adjust A5R21 for similar negative going pulses. The pulses should have a baseline of 5 volts and should go to 0 volts. Also listen for the MET tone on the loudspeaker.

f. On the signal generator press [RF LEVEL] [KNOB/STEP]. Using the control knob, slowly reduce the signal levels (approximately -95 to -98 dBm). Readjust R21 for the lowest signal strength with reliable pulses at A5TP4.

NOTE: Narrow, negative, and less than 20 µsec "slivers," between pulses are acceptable.

g. Press [RCL] 111 [ENTER], [MOD ON/OFF], to reset the signal generator to 1680 MHz, @ -60 dBm, modulation on. Observe reliable pulses at A5TP4.

1.5 MET Drive Pulse Width Adjustment (A5R45)

a. Move the oscilloscope channel 2 probe to A5TP7. Observe +3.5 volt pulses.

b. Adjust A5R45 for 500 µsec wide pulses at A5TP7.

1.6 MCU Retransmitter MET Pulse Width Adjustment

This adjustment sets the nominal 500 µsec MET Data pulse width for proper MCU to Microcomputer MET data transmission. This adjustment should be verified/performed following the MET Threshold Adjust and MET Drive Pulse Width Adjust in the previous section.

a. At the MCU, monitor A6TP1 with the oscilloscope.

b. Observe and verify a pulse train of 5-volt peak pulses at approximately 100 pulses per second.

c. Adjust the sweep rate and sync on the oscilloscope to display a single pulse, then adjust A6R4 for a pulse width of 500 µsec.

REPORTING INSTRUCTIONS:

Report the completed maintenance on a WS Form A-26, Maintenance Record, using the instructions in Engineering Handbook No. 4 (EHB-4), Engineering Management Reporting System (EMRS), Part 2, and Attachment F. Include the following information on the WS Form A-26:

Block #	Block Type	Information
5	Description	Perform Receiver Alignment Procedure I.A.W. ART-1/2 Maintenance Note 19, Rev A.
7	Equipment Code	ART1 or ART2 (as appropriate)
15	Comments	Performed Receiver Alignment Procedure I.A.W. ART-1/2 Maintenance Note 19, Rev A.
17a	Mod. No.	M19A

John McNulty
Chief, Maintenance, Logistics, and Acquisition Division

Attachment A - Marconi 2024 Memory Settings
Attachment B - WS Form A-26 Sample

ATTACHMENT A

Marconi 2024 Memory Settings

Perform the following signal generator parameter memory stores. The ART alignment refers to these memory settings to facilitate the signal generator setup for the receiver and tracking alignments. Reading the table from left to right, follow the instructions given below. Reference the Marconi Operating Manual for complete operating instructions.

Saving Power Up Settings						
To reset generator to factory settings 2	RCL	999	Hz ENTER			
Set to 1680 MHz 2	CARR FREQ	1680	MHz			
Enable internal pulse modulation 2	MENU	22	Hz ENTER	2		
Set to -60 dBm 2	RF LEVEL	-60	Hz ENTER			
Set to AM external 2	MENU	20	Hz ENTER	PREV or NEXT	**AM ext**	SELECT LOCAL
Set modulation source and AM depth of modulation 2	MENU	30	Hz ENTER	PREV or NEXT	**Ext:**	2
	MOD	SOURCE ON/OFF	**ON**	30	%	

Store settings 2	STO	100	Hz ENTER			
Storing power up settings 2	MENU	54	Hz ENTER	PREV or NEXT	**Power Up Choice**	1
	NEXT	**Recall memory**	100	Hz ENTER		
Storing AGC Alignment Settings						
Store 1655 MHz 2	CARR FREQ	1655	MHz E>	STO	101	Hz ENTER
Store 1670 MHz 2	CARR FREQ	1670	MHz E>	STO	102	Hz ENTER
	STO	0	Hz ENTER			
Store 1690 MHz 2	CARR FREQ	1690	MHz E>	STO	1	Hz ENTER
Recall 1680 MHz 2	RCL	100	Hz ENTER			
Store -74 dBm 2	RF LEVEL	-74	Hz ENTER	STO	103	Hz ENTER

Store -5 dBm 2	RF LEVEL	-5	Hz ENTER	STO	104	Hz ENTER
Store -100 dBm 2	RF LEVEL	-100	Hz ENTER	STO	105	Hz ENTER
Store -80 dBm 2	RF LEVEL	-80	Hz ENTER	STO	106	Hz ENTER
Store -104 dBm 2	RF LEVEL	-104	Hz ENTER	STO	107	Hz ENTER
Store -4 dBm 2	RF LEVEL	-4	Hz ENTER	STO	108	Hz ENTER
Storing AFC Alignment Settings						
Store 10.7 MHz at 6.2 dBm for a 1.6 - 1.8 V p-p output level 2	CARR FREQ	10.7	MHz	RF LEVEL	6.2	Hz ENTER
	STO	109	Hz ENTER			
Store 10.45 MHz 2	CARR FREQ	10.45	MHz	STO	110	Hz ENTER

	STO	2	Hz ENTER			
Store 10.95 MHz 2	CARR FREQ	10.95	MHz	STO	3	Hz ENTER
Storing MET Data Digitizer Settings						
Store 1680 MHz at -60 dBm, INT Pulse Mod ON at 100 Hz 2	RCL	100	Hz ENTER	MOD	MOD	**Pulse Mod INT OFF**
	SOURCE ON/OFF	**Pulse Mod INT ON**	MOD SOURCE	100	Hz ENTER	STO
	111	Hz ENTER				
Video Amplifier Alignment (A14R36 and A5R10)						
Store -30dBm 2	RCL	103	Hz ENTER	RF LEVEL	-30	Hz ENTER
	STO	112	Hz ENTER			

Routine Maintenance						
Store -50 dBm 2	RF LEVEL	-50	Hz ENTER	STO	115	Hz ENTER
Store -40 dBm 2	RF LEVEL	-40	Hz ENTER	STO	116	Hz ENTER
Store -30 dBm 2	RF LEVEL	-30	Hz ENTER	STO	117	Hz ENTER
Store 0.0 dBm 2	RF LEVEL	0	Hz ENTER	STO	118	Hz ENTER
Store 1680 MHz at -50 dBm, INT Pulse Mod ON at 200 Hz 2	RCL	115	Hz ENTER	SOURCE ON/OFF	MOD	MOD
	Pulse Mod INT OFF	SOURCE ON/OFF	**Pulse Mod INT ON**	MOD SOURCE	200	Hz ENTER
	STO	119	Hz ENTER			

ATTACHMENT B

WS FORM A-26 (4/94)

WS FORM A-26 (4/94)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE

ENGINEERING MANAGEMENT REPORTING SYSTEM
MAINTENANCE RECORD

Document Number: **G 49978**

General Information	1. Open Date: **10 / 15 / 01**	Time: **0900**	2. Initials: **JMM**	3. Response Priority (check one): ○ Immediate ○ Routine ○ Low **X** Not Applicable	4. Close Date: **10 / 15 / 01**	Time: **1100**

5. Description
Perform Receiver Alignment Procedure I.A.W. ART1/2 Maintenance Note 19, Revision A

Equipment Information	6. Station ID	7. Equipment Code	8. Serial Number	9. TM	10. AT	11. How Mal.
	AMA	**ART1**	**019**	**E**	**M**	**999**

12. *EQUIPMENT OPERATIONAL STATUS TIMES*	a. **Fully Operational**	b. Logistics Delay	**Partly Operational**	c. All Other	d. Logistics Delay	**Not Operational**	e. All Other
							2:00

13. *Parts Failure Information*

Block #	a. ASN	b. NSN	c. TM	d. AT	e. How Mal.	f. Qty.	g. Maint. Hrs.
1							
2							
3							
4							
5							

14. *Work Load Information*

Type	Staff Hrs.
a. Routine	
b. Non-routine	
c. Travel	
d. Misc.	**2:00**
e. Overtime	

Miscellaneous Information	15. Maintenance Comments	16. Initials
	Performed Tracking Alignment Procedure I.A.W ART1/2 Maintenance Note 19, Revision A	**JMM**

17. *SPECIAL PURPOSE REPORTING*	a. Mod. No.	b. Mod./Act./Deact.Date	c.	d.	e.
	M19A	**10/15/01**			

18. *CONFIGURATION MGMT. REPORTING* *(use as directed)*	ASN	Vendor Part Number (New Part)	Serial Number (Old Part)	Serial Number (New Part)